

ABSTRACT OF THE DISCLOSURE

An optical switch and method of making in which a large number of optical elements, which may be diffractive or refractive, are formed within the plane of a wafer to transmit light approximately perpendicularly to the wafer plane. The optical elements are formed on separate deformable mechanical elements, such as a plate rotatable about two axes lying approximately parallel to the wafer plane. Electrical elements, such as capacitor plates with a free-space gap therebetween selectively deform the mechanical elements in a micro electromechanical system (MEMS) arrangement with the optical elements disposed upon the mechanical elements to separately control the directions in which the light beams are transmitted. The optical switches may be formed in an array, and two levels of such arrays formed in separate wafers which are bonded together allow two-stage switching of light through the assembled structure.

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